

WHAT IS CLAIMED:

1. A process for manufacturing a multicolor electrophoretic display, comprising the steps of:
 - a) filling display cells with a filler material;
 - b) selectively opening filled cells and removing the filler material from the opened cells;
 - c) filling said opened cells with a display fluid and a dispersion of a sealing material which has a specific gravity lower than that of the display fluid;
 - d) sealing said opened and filled cells of (c) by hardening the dispersion of the sealing material during or after it phase separates and forms a supernatant layer above the display fluid; and
 - e) repeating the above a) through d) processing steps sequentially with one or more different color display fluids until the multicolor display is formed.
2. The process of Claim 1 wherein said filling is carried out by screen printing, gravure printing or inkjet printing.
3. The process of Claim 2 wherein said filling is carried out by inkjet printing.
4. The process of Claim 1 wherein step (b) is carried out by coating said filled cells with a layer of photoresist, followed by imagewise exposing and developing the exposed photoresist.
5. The process of Claim 1 wherein said filler material is capable of being readily removed from the cells by using a cleaning solution which is a weak solvent or non-solvent for a non-exposed photoresist, but is a good solvent or dispersion medium for the filler material.
6. The process of Claim 5 wherein said cleaning solution is an aqueous solution.
7. The process of Claim 1 wherein said filler material is selected from the group consisting of organic particulates, inorganic particulates, polymer particulates, water soluble and dispersible polymers, and mixtures thereof.

8. The process of Claim 7 wherein said filler material is selected from the group consisting of water-dispersible branched sulfopolyesters, carboxylated acrylic-based polymers, poly(vinyl alcohol), polyvinylpyrrolidone, poly(4-vinyl phenol), pre-exposed positive photoresists, polyacrylic acid, polymethacrylic acid, and their copolymers, zinc ionomer of ethylene copolymer, sodium ionomer dispersion of ethylene acrylic acid copolymer, and N,N-diethylethanolamine dispersions, non-film forming latexes, colloidal silica and mixtures thereof.

9. The process of Claim 1 wherein said filler material comprises an additive selected from the group consisting of surfactants, dispersing agents and photosensitive dissolution-inhibiting compounds.

10. The process of Claim 9 wherein said photosensitive dissolution-inhibiting compound is a diazide compound.

11. The process of Claim 1 wherein said filler material is a pre-exposed positive working novolac photoresist.

12. The process of Claim 4 wherein said photoresist comprises a layer with a thickness in the range of about 0.5 to 15 microns.

13. The process of Claim 12 wherein said photoresist comprises a layer with a thickness in the range of about 1 to 3 microns.

14. The process of Claim 11 wherein said photoresist is selected from the group consisting of the novolac-based photoresist S-1818, SJR-1075, SJR-3000, SJR-5440, SJR-5740, AZ-9260, AZ-4620, AZ-4562, THB-Positive and mixtures thereof.

15. The process of Claim 4 wherein said photoresist is a polyvinylphenol-based photoresist.

16. The process of Claim 4 wherein said photoresist is a t-BOC derivative of a polyvinylphenol-based photoresist.

17. The process of Claim 4 wherein said exposing step is performed by radiation with UV, visible light or other radiation sources.

18. The process of Claim 17 further comprising a step of soft baking the photoresist before said exposing step.

19. The process of Claim 4 wherein said developing step comprises contacting said exposed cells with a developing solution.

20. The process of Claim 19 wherein said developing solution is a base developer selected from the group consisting of alkaline solutions, sodium hydroxide, sodium tetraborate decahydrate and borate solution and potassium hydroxide and borate solution.

21. The process of Claim 19 wherein said developing solution comprises an additive.

22. The process of Claim 21 wherein said additive is a surfactant or dispersing agent.

23. The process of Claim 4 wherein the developing step further comprising a step of washing the developed cells with a solvent or a mixture of solvents.

24. The process of Claim 23 wherein the solvent is distilled water or deionized water.

25. The process of Claim 1 wherein said display fluid is an electrophoretic fluid comprising a dispersion of particles in a colored dielectric solvent.

26. The process of Claim 25 wherein said particles are white particles.

27. The process of Claim 1 wherein said display fluid is liquid crystals.

28. The process of Claim 27 wherein said liquid crystals comprise a dichroic dye.

29. The process of Claim 1 wherein said display fluid colors are red, blue and green in no particular order.

30. The process of Claim 1 wherein said sealing material is a thermoplastic or thermoset precursor composition.

31. The process of Claim 30 wherein said hardening of said thermoplastic or thermoset precursor composition is accomplished by evaporation of a solvent or plasticizer, by cooling, interfacial reaction, moisture, heat, radiation or a combination of the above-mentioned methods.

32. The process of Claim 1 wherein the steps are performed in a roll-to-roll processing technology, conveyed in continuous or semi-continuous operation.

33. The process of Claim 8 wherein said non-film forming latex is PMMA or polystyrene latex.

34. A multicolor electrophoretic display manufactured according to the process of Claim 1 wherein the optically active viewing fraction of surface area of said display is greater than about 40%.